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Voluntary Product Standard

PS 60-73

HARDBOARD SIDING



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Voluntary Product Standard PS 60-73

Hardboard Siding

Approved by the American National Standards Institute on December 18, 1973,
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Abstract

This Voluntary Product Standard covers requirements and methods of test for the dimensions, straightness, squareness, physical properties, and surface characteristics of hardboard siding. Definitions of trade terms used and methods of identifying products that comply with the standard are included.

Key words Hardboard siding; siding, hardboard.

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VOLUNTARY PRODUCT STANDARDS

Voluntary Product Standards are developed under procedures published by the Department of Commerce in Part 10, Title 15, of the Code of Federal Regulations. The purpose of the standards is to establish nationally recognized requirements for products, and to provide all concerned interests with a basis for common understanding of the characteristics of the products. The National Bureau of Standards administers the *Voluntary Product Standards* program as a supplement to the activities of the private sector standardizing organizations.

Establishment of a VOLUNTARY PRODUCT STANDARD

The role of the National Bureau of Standards in the establishment of a *Voluntary Product Standard* is to (1) act as an unbiased coordinator in the development of the standard, (2) provide editorial assistance in the preparation of the standard, (3) supply such assistance and review as is required to assure the technical soundness of the standard, (4) seek satisfactory adjustment of valid points of disagreement, (5) determine the compliance with the criteria of the Department's procedures, (6) provide secretarial functions for each committee appointed under the Department's procedures, and (7) publish the standard as a public document.

Producers, distributors, users, consumers, and other interested groups contribute to the establishment of a *Voluntary Product Standard* by (1) initiating and participating in the development of the standard, (2) providing technical or other related counsel as appropriate relating to the standard, (3) promoting the use of and support for the standard, and (4) assisting in keeping the standard current with respect to advancing technology and marketing practices.

Use of a VOLUNTARY PRODUCT STANDARD

The use of a *Voluntary Product Standard* is voluntary; the National Bureau of Standards has no regulatory power in the enforcement of the provisions of the standards. However, since the standards represent a consensus of all interested groups, their provisions are likely to become established as trade customs. In addition, when a standard is made a part of a legal document, such as a sales contract or code, compliance with the standard is enforceable.

The benefits derived from *Voluntary Product Standards* are in direct proportion to their general recognition and actual use. Producers and distributors whose products meet the requirements of a *Voluntary Product Standard* may refer to the standard in advertising and on labels to promote greater public understanding of or confidence in their products. Purchasers may order products conforming to the requirements of the standards.

For copies of the *Voluntary Product Standards* procedures or for more information concerning the development and use of these standards, you may write to: Office of Engineering Standards Services: National Bureau of Standards; Washington, D.C. 20234.

Hardboard Siding

Effective October 23, 1973 (See section 6.)

(This Standard, which was initiated by the American Hardboard Association, has been developed under the *Procedures for the Development of Voluntary Product Standards* of the U.S. Department of Commerce. See Section 7, *History of Project*, for further information.)

1. PURPOSE

The purpose of this Voluntary Product Standard is to establish nationally recognized dimensional and quality requirements for hardboard siding and to provide producers, distributors, and users with a basis for common understanding of the characteristics of this product.

2. SCOPE AND CLASSIFICATION

2.1. Scope—This Voluntary Product Standard covers requirements and methods of test for the dimensions, straightness, squareness, physical properties, and surface characteristics of hardboard siding.¹ Definitions of trade terms used and methods of identifying products that comply with this Standard are included.

Note: As an aid in correlating U.S. customary units to metric units, conversion factors for the units used in this Standard are given in an appendix.

2.2. Classification—This Standard covers the following types and surfaces of hardboard siding:

Types:

Lap Siding—After installation, yields a pattern of overlapped planks. This siding may either be embossed or smooth on the face.

Panel siding—After installation, yields a flush surface. This siding may be either embossed, grooved, or smooth on the face.

Surfaces:

Unprimed—Siding that has only the surface characteristics provided by the basic manufacturing process.

Primed—Siding that has been coated with a primer to provide a surface more receptive to paint.

3. REQUIREMENTS

3.1. General—Products represented as complying with this Voluntary Product Standard shall meet all of the requirements specified herein. The inspection

and test procedures contained in sections 3 and 4 are to be used to determine the conformance of products to the requirements of this Voluntary Product Standard. Each producer or distributor who represents his products as conforming to this Standard may utilize statistically based sampling plans which are appropriate for each particular manufacturing process but shall keep such essential records as are necessary to document with a high degree of assurance his claim that all of the requirements of this Standard have been met. Additional sampling and testing of the product, as may be agreed upon between purchaser and seller, is not precluded by this section.

3.2. Dimensions and tolerances—The dimensions and tolerances for the siding shall be as specified in table 1. Thickness shall be determined in accordance with sections 146–149 of American Society for Testing and Materials (ASTM) D 1037–72a, *Standard Methods of Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials*.²

3.3. Edge straightness—The edges of the siding shall be straight within 1/64 inch for each foot of length or width. Edge straightness shall be determined by stretching a string or wire from one corner to the adjacent corner and measuring the widest distance between the string or wire and the siding edge being tested.

3.4. Squareness—The difference between the lengths of the face diagonals shall not vary by more than 1/64 inch for each foot of length of the siding. Opposite sides of the siding shall not vary in length more than 1/8 inch.

3.5. Physical properties—The siding shall be manufactured primarily of inter-felted ligno-cellulosic fibers, consolidated under heat and pressure in a hot-press to a density of not less than 31 pounds per cubic foot, and shall have the properties specified in table 2 when tested in accordance with the test methods indicated therein. Specimens shall be selected for testing as diagramed in figure 1.

¹ Other Voluntary Product Standards cover:
a. Basic hardboard
b. Prefinished hardboard paneling

² Later issues of this publication may be used providing the requirements are applicable and consistent with the issue designated. Copies are obtainable from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa. 19103.

TABLE 1. *Dimensions and tolerances for hardboard siding*

Type of siding	Dimensions (nominal)			Length and width	Tolerances	
	Length	Width a	Thickness		Thickness	
					nominal thickness	min - max
Lap siding	<i>feet</i> 4 through 16 in 2-foot increments	<i>inches</i> 4, 6, 8, 9, 10 and 12	<i>inches</i> 3/8 7/16	<i>inches</i> plus 0 minus 1/8	<i>inches</i> 1/4 (.0250)	<i>inches</i> 0.220-0.265
	4, 6, 7 8, 9, 10 and 12	48	1/4 3/8 7/16	for all lengths and widths	3/8 (.375) 7/16 (.438)	.325- .375 .376- .450

^a Pertains to the exposed width; actual width may be greater due to certain edge details such as shiplapped edges.

3.6. Face surface characteristics — All face characteristics shall be uniform in appearance and shall be as free from visible defects in the surface plane as commercially practicable when visually inspected by an individual competent in the field.

3.7. Linear expansion—The siding shall meet the maximum linear expansion requirements specified in table 3 when tested in accordance with sections 107–110 and Note 39 of ASTM D 1037–72a; except that, the test specimens for lap siding shall be cut parallel with the long dimension of the siding.

Figure 1. Test specimen cutting diagram for hardboard siding.^a

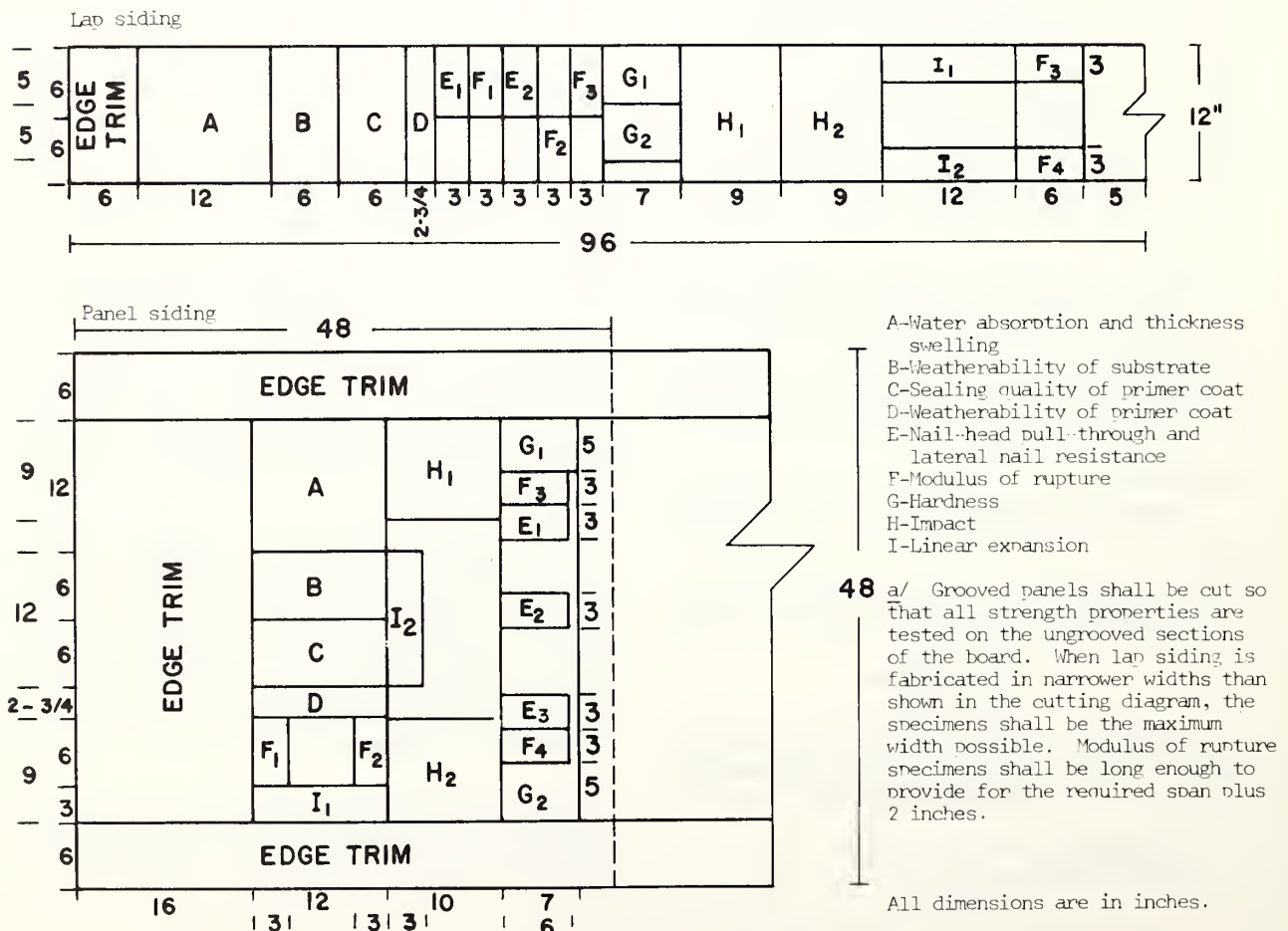


TABLE 2. *Physical properties of hardboard siding*

Property	Requirement	Test method ^a
Percent water absorption based on weight (max av per panel)	Primed 15 Unprimed 20	Sections 158 and 159
Percent thickness swelling (max av per panel)	Primed 10 Unprimed 15	Sections 158 and 159
Weatherability of substrate (Max swell after 5 cycles), in	0.010 & no objectionable fiber raising	4.1 of this Standard
Sealing quality of primer coat	No visible flattening	4.2 of this Standard
Weatherability of primer coat	No checking, erosion, or flaking	4.3 of this Standard
Nail-head pull-through, lb (min av per panel)	150	Sections 54-60; except that specimens shall be tested in the dry condition. Three 6-penny (0.113 inch wire diameter and 17/64 inch head diameter) nails shall be used per specimen. The nails shall be driven into the specimen at least 1 inch apart. The holding fixture shall consist of a plate with a 1 1/2-inch diameter opening centered in it, and the speed of testing shall be at a rate of 0.125-0.175 inch per minute.
Lateral nail resistance, lb (min av per panel)	150	Sections 41-46; except that specimens shall be tested in the dry condition. One 8-penny (0.131 inch diameter) nail shall be used per specimen spaced 3/8 inch from any specimen edge. ^b Testing speed shall be 0.125-0.175 inch per minute.
Modulus of rupture (min av per panel), psi	1800 for 3/8 & 7/16-inch-thick siding 3000 for 1/4-inch-thick siding	Sections 150-153; except that specimens of siding having a nominal thickness of 7/16 inch shall have a span of 4 inches between supports.
Hardness (min av per panel), lb	450	Sections 68-73
Impact (min av per panel), in	9.0	Sections 91-95 except that the initial drop shall be 9 inches. Failure shall be when a visible fracture occurs at the bottom surface of the specimen.
Moisture content, ^c percent	2.0 - 9.0 incl., and not more than 3 percent variance between any two boards in any one shipment or order.	Sections 160 and 161

^a Unless otherwise indicated, the test method reference pertains to sections in ASTM D 1037-72a (see footnote 2, p. 1).

^b Galvanized nails may bend; therefore, a steel carding pin or steel drill rod of the same diameter may be used.

^c Since hardboard is a wood-base material, its moisture content will vary with environmental humidity conditions. When the environmental humidity conditions in the area of intended use are a critical factor, the purchaser should specify a moisture content range more restrictive than 2 to 9 percent, so that fluctuation in the moisture content of the siding will be kept to a minimum.

TABLE 3. *Maximum linear expansion*

Type of siding	Thickness range	Maximum linear expansion
Lap	<i>inches</i>	<i>percent</i>
	0.325-0.375 over 0.376	0.38 0.40
Panel	0.220-0.265	0.36
	0.325-0.375	0.38
	over 0.376	0.40

4. INSPECTION AND TEST PROCEDURES

4.1. Weatherability of substrate—

A. Apparatus—The apparatus shall consist of a forced-air-circulating oven, a micrometer reading to 0.001 inch, and a controlled temperature bath.

B. Test specimen—Primed specimens shall be tested as received. Unprimed specimens shall be primed on the face side only with a primer meeting the requirements of Federal Specification TT-P-25c, *Primer Coating, Exterior (Undercoat for Wood, Ready-Mixed, White and Tints)*,³ applied at a rate of 450 square feet per gallon. The edges of the specimens shall not be primed.

C. Procedure—

- (1) Condition the specimen in the oven at 135 °F for 24 hours.
- (2) Remove the specimen from the oven and measure its thickness to the nearest 0.001 inch at the midpoint of its four sides, $\frac{3}{8}$ inch in from the edge.
- (3) Five minutes after removal from the oven, immerse the specimen face down in 1 inch of water which is maintained at 70 ± 2 °F.
Position the specimen with small supports so that the face is 0.05 to 0.10 inch below the water surface and leave immersed for 4 hours.
- (4) Remove the specimen from the water and remeasure it as described in (2) above.
- (5) Place the specimen in the oven at 135 °F for 20 hours.
- (6) Repeat steps (2) through (5) above for a total of five cycles.

D. Calculation and inspection—The average increase in thickness of the four measurements described in (2) above, between an oven-dried and water-immersed condition, shall be calculated for each

cycle. Any fiber raising observed after the fifth cycle shall be reported.

4.2. Sealing quality of primer coat—

A. Material—Paint meeting the requirements of Federal Specification TT-P-105a, *Paint, Oil: Chalk-Resistant, Lead-Free, Exterior Ready-Mixed, White and Tints*.³

B. Procedure—Apply one coat of paint by brush to the primed test specimen at a rate of 500 square feet per gallon. Allow the paint to dry for 24 hours and examine the test specimen for any flattening of the paint caused by penetration. Flattening caused by scratches or other damage to the primer coat from improper handling should be disregarded.

4.3. Weatherability of primer coat—

A. Apparatus—A weathering appliance of Type D or DH as described in ASTM E 42-69, *Recommended Practice for Operating Light- and Water-exposure Apparatus (Carbon-Arc Type) for Exposure of Nonmetallic Materials*,⁴ and paint meeting the requirements of Federal Specification TT-P-105a.

B. Procedure—

- (1) The primed siding specimen shall be placed in the weathering appliance and tested for 3 weeks using the following cycle:
 - (a) Expose the specimen to 102 minutes of light only followed by 18 minutes of light with a spray.
 - (b) Repeat (a) for a total of 20 hours.
 - (c) Allow the specimen to rest for 4 hours.
 - (d) Repeat (a), (b), and (c) for 5 days and then allow the specimen to rest for 48 hours.
- (2) After 3 weeks, the specimen shall be brush-painted with one coat at a spreading rate of 500 square feet per gallon. Allow the paint to dry for 1 week before exposing the specimen for an additional 9 weeks in the weathering appliance, cycled as described in (1) above.

C. Inspection—Inspect for any visible defect (checking, cracking, erosion, or flaking) after 3 weeks, before painting; and after 13 weeks.

³ Later issues of this publication may be used providing the requirements are applicable and consistent with the issue designated. Copies of Federal Specifications are available from Specification Sales (3FRDS) Bldg. 197, Washington Navy Yard, General Services Administration, Washington, D.C. 20407.

⁴ See footnote 2, page 1.

5. DEFINITIONS

For the purposes of this Standard, the following definitions shall apply:

Checking—Slight breaks in the primer coat that do not penetrate the substrate.

Cracking—Breaks in the primer coat which allow the substrate to become visible.

Erosion—The wearing away of the primer coat to expose the substrate.

Fiber raising—The swelling of individual wood fibers on the board surface which causes them to be raised above the plane of the board surface.

Flaking—The detachment of the primer coat from its substrate.

6. EFFECTIVE DATE AND IDENTIFICATION

The effective date of this Standard is October 23, 1973. As of the effective date, reference to PS 60-73 may be made in contracts, codes, advertising, invoices, product labels, and the like, but no product may be advertised or represented in any manner which would imply or tend to imply approval or endorsement of that product by the National Bureau of Standards, the Department of Commerce, or by the Federal Government.

The following statements are suggested for use in representing products as conforming to all requirements of this Standard:

- (1) "This (lap or panel) (primed or unprimed), hardboard siding conforms to all requirements established in Voluntary Product Standard PS 60-73, developed and published in accordance with the U.S. Department of Commerce *Procedures for the Development of Voluntary Product Standards*. Full responsibility for the conformance of this product to the standard is assumed by (name and address of producer or distributor)."
- (2) "Conforms to PS 60-73, (lap or panel), (primed or unprimed) (name and address of producer or distributor)."

7. HISTORY OF PROJECT

In 1969, the American Hardboard Association requested that the National Bureau of Standards initiate

a standard for hardboard siding under the *Procedures for the Development of Voluntary Product Standards*. A proposed standard was submitted to the Standing Committee in May 1973. The recommended Standard was then circulated for acceptance in July 1973. The responses to this circulation indicated consensus among producers, distributors, and users in accordance with the published procedures.

The new standard was designated Voluntary Product Standard PS 60-73, *Hardboard Siding*, and became effective on October 23, 1973.

Technical Standards Coordinator:

Karl G. Newell, Jr., Office of Engineering Standards Services, National Bureau of Standards, Washington, D.C. 20234

8. STANDING COMMITTEE

A Standing Committee has been appointed to assist in keeping this Voluntary Product Standard up to date. The names of the members of the committee are available from the Office of Engineering Standards Services, Washington, D.C. 20234, which serves as the secretariat of the committee.

APPENDIX

The conversion factors and units contained in this appendix are in accordance with the International System of Units (abbreviated SI for *Système International d'Unités*). The SI was defined and given official status by the 11th General Conference on Weights and Measures which met in Paris in October 1960. For assistance in converting U.S. customary units to SI units, see ASTM E 380, *ASTM Standard Metric Practice Guide*, available from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa. 19103. The conversion factors for the units found in this Standard are as follows:

1 inch = 25.4 millimeters

1 foot = 0.3048 meter

1 pound per square inch = $6.894\,757 \times 10^3$ pascals


1 pound-force = 4.448 222 newtons

$t_C = (t_F - 32) / 1.8$

where:

t_C = temperature in degrees Celsius

t_F = temperature in degrees Fahrenheit



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¹ Headquarters and Laboratories at Gaithersburg, Maryland, unless otherwise noted; mailing address Washington, D.C. 20234.

² Part of the Center for Radiation Research.

³ Located at Boulder, Colorado 80302.

⁴ Part of the Center for Building Technology.

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